

Appl. No. 10/538,914
Amdt. dated March 22, 2007
Reply to Office action of October 2, 2006

REMARKS

Claims 9-27 are now in this application.

Claims 21 and 22 have been amended to overcome the examiners objection. Thus, all of claims 16, 20, 22, and 24 should now be allowable.

The examiner's indication that claims 17 and 18 contain allowable subject matter is acknowledged with appreciation.

Claim 9 has been amended by incorporating language into it which recites that the insulation is applied, including at at least one edge, with a constant thickness.

It is also pointed out that new claim 27 has been added, which new claim 27 is the same as claim 9, except for the addition of a statement that the thickness of the insulation layer at the edge is the same thickness as for all areas of the insulation layer.

The examiner has rejected claim 9 as being unpatentable over Kawazoe. Claim 9 has been amended to recite a specific characteristic of the thickness of the layer of insulation, that it is constant at at least one edge of the piezoelectric actuator.

The insulation layer (4) of the Kawazoe reference does not teach this characteristic. The examiner has pointed to figure 15 of Kawazoe, but this embodiment of Kawazoe does not teach covering any of the edges. In fact, as shown by areas 48, portions of the piezoelectric material are left uncovered and un-insulated. And as also shown in figure 15, the insulation layer of Kawazoe tapers at its ends, near abutment members 61 and 62. Kawazoe thus teaches away from a constant thickness. In the present invention, as expressed in claim 9 and even more so in new claim 27, the covering has a constant thickness.

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The examiner states that it would have been obvious "to eliminate the insulation on the outer electrode, as the device would perform the same function without this material". Applicant disagrees with the examiners argument and points out that the casing 4 of the Kawazoe reference primarily serves to hold the piezoelectric actuator 1 together between the actuator head and foot 61, 62. Without the entire casing 4, the actuator would not have the same strength as it does with this entire casing, and it would face the prospect of less structural integrity.

Applicant would like to refer again to the introductory portion of the application and summarize the advantages of the invention briefly below. As already recited in the previous version of claim 9, the insulation comprising an adherent tape 7, 8 which is applied solely in the region between the outer electrodes 5, 6, and not, as in Kawazoe, as a covering for the outer electrodes 31, 32 themselves. In Kawazoe, the casing 4 furthermore primarily serves to hold the piezoelectric actuator 1 together between the actuator head and foot 61, 62.

Applicants' highly adherent tape, which is preferably an adhesive tape, covers only a precisely predetermined region which is between the outer electrodes 5, 6, and the adherent or adhesive layer 7, 8 simultaneously acts as an insulating layer as well.

The adherent tape is formed of a prefabricated, dimensionally precise material as recited in claims 11 and 12. And in accordance with the production method, as recited in claims 13-26, it is also claimed is being glued on, or rolled on, or melted on, or vulcanized on, or sintered on, or in a combination of the aforementioned production options, and this is accomplished without the creation of bubbles.

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With this invention, as recited in claim 9 and also in new claim 27, a uniform layer thickness, including at the edges of the piezoelectric actuator, proves to have particular advantages. According to the invention the dry application of the adherent tape 7, 8 is done dimensionally precisely and in pre-shaped fashion, or is deformable during the application and leads to piezoelectric actuators that can immediately be further processed, without pressure points and/or waiting for laquer to dry. As can also be learned from the introduction to this application, a major advantage is the bubble-free application, for instance by rolling on, of the adherent tape 7, 8 both on a smooth surface and also very particularly at edges. Optionally with targeted heat and contact pressure and/or rolling on, a complete coverage, including the edges of the piezoelectric layers can be achieved, and the adherent tape 7, 8 covers the edges as well with a precise fit, without stress and with a constant thickness. In this way, a durable, bubble-free adhesion and covering is assured.

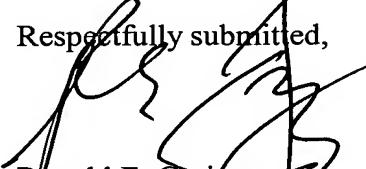
It is pointed out that the addition to claim 9 that the adherent band 7, 8 is applied in a tension-free manner exactly in the region between the outer electrodes 5, 6 and covering at least one edge of the piezoelectric actuator with constant thickness is found and supported in the specification, particularly in the section headed "Advantages of the Invention" and most particularly in paragraph 12. This structure is also shown in Fig. 2.

The closest prior art does not provide even the least suggestion of this combination of characteristics.

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The Commissioner is authorized to charge a fee of \$1020.00, for a three month extension of time as specified in the fee schedule for 2007, or any other necessary fees in connection with this communication, to Deposit Account Number 07-2100.

For the above reasons, entry of the amendment and allowance of the claims are courteously solicited.

Respectfully submitted,

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